CLAIMS

1. A downhole tool for selectively performing a task in a well bore, the tool comprising a substantially cylindrical body having a central bore running axially therethrough, a sleeve located within the bore, the sleeve including a ball seat, a plurality of balls, each ball having substantially similar dimensions and each ball arresting a majority of fluid flow through the bore when located in the ball seat, mechanical biasing means located between the sleeve and the body to bias the sleeve in a first direction, and functional means on the body to perform a task in the well bore, the functional means being operable on relative movement of the sleeve, wherein the functional means has at least a first and a second operating position, each change in position being effected by passing a said ball through the sleeve in a reverse direction, and wherein the said changes form a cyclic pattern such that the functional means can be cycled back to the first operating position.

2. A downhole tool as claimed in Claim 1 wherein the ball seat releasably retains each ball.

3. A downhole tool as claimed in Claim 1 or Claim 2 wherein the balls are deformable.

4. A downhole tool as claimed in Claim 1 or Claim 2 wherein the ball seat is a deformable ball seat which flexes to release the ball.

5. A downhole tool as claimed in Claim 4 wherein the deformable ball seat comprises a spring such as a disc spring.

6. A downhole tool as claimed in Claim 1 or Claim 2 wherein the ball seat comprises a helical channel on an inner surface of the sleeve.

7. A downhole tool as claimed in any one of Claims 4 to 6 wherein the balls are of a non-pliable material and thus cannot deform.

8. A downhole tool as claimed in any preceding Claim wherein the mechanical biasing means is a strong spring.

9. A downhole tool as claimed in any preceding Claim wherein a chamber exists between the sleeve and the body which acts as a damper during movement of the sleeve relative to the body.

10. A downhole tool as claimed in any preceding Claim wherein a choke ring is located around the sleeve to provide a damping action by forcing passing fluid to slow down as the sleeve moves relative to the tool body.

11. A downhole tool as claimed in any preceding Claim wherein the tool further comprises engagement means to control relative movement between the sleeve and the body.

12. A downhole tool as claimed in any preceding Claim wherein said engagement means comprises at least one index pin located in a profiled groove which extends around the tool.

13. A downhole tool as claimed in any preceding Claim wherein the tool further includes a ball non-return element.

14. A downhole tool as claimed in Claim 13 wherein the element is a split ring located on a ramp within the bore.

15. A downhole tool as claimed in any preceding Claim wherein the tool includes a ball arrester.

16. A downhole tool as claimed in Claim 15 wherein the arrester comprises a plurality of surfaces transversely arranged to the central bore to provide a convoluted path which a ball must take through the sleeve.

17. A downhole tool as claimed in any preceding Claim wherein the tool further comprises a second ball seat, located below the sleeve.

18. A downhole tool as claimed in Claim 17 wherein the second ball seat comprises a collet including a plurality of fingers directed in the first direction operated by the sleeve.

19. A downhole tool as claimed in Claim 17 wherein the second ball seat comprises a trapped 'C' ring.

20. A downhole tool as claimed in Claim 17 wherein the second ball seat is a shuttle arrangement, wherein the relative position of shuttle elements provide a seat to prevent passage of a ball.

21. A downhole tool as claimed in any preceding Claim wherein the tool is a circulation tool.

22. A downhole tool as claimed in Claim 21 wherein the functional means comprises at least one first port arranged substantially transversely to the central bore through the body, and at least one second port arranged transversely to the central bore through the sleeve, such that alignment of the ports causes fluid to be discharged from the central bore and wherein alignment of the ports is controlled by relative movement of the sleeve.

23. A downhole tool as claimed in any preceding Claim wherein the tool includes ball collecting means.

24. A method of circulating fluid in a borehole, the method comprising the steps:

(a) inserting in a work string a tool comprising a tubular body including a plurality of first radial outlet ports in which is located a sleeve including a plurality of second radial outlets;

(b) running the work string and tool into a borehole, with the sleeve in a first position relative to the body wherein the first and

second radial outlets are arranged in a first operating position;

(c) dropping a ball into the work string such that the ball lands on the sleeve and forces the sleeve into a second position relative to the casing wherein the first and second radial outlets are arranged in an intermediate operating position and fluid flow is restricted by the ball; and

(d) increasing pressure behind the ball to cause the ball to pass through the sleeve, the releasing pressure allowing the sleeve to move to a third position relative to the body wherein the first and second radial outlets are arranged in a second operating position; and wherein the ports are aligned in a either of the operating positions and misaligned in the other operating position.

25. A method as claimed in Claim 24 wherein the method further includes the steps of:

(e) dropping a second ball, identical to the first ball, into the work string such that the second ball lands on the sleeve and forces the sleeve into the second position relative to the body wherein the first and second radial outlets are arranged in the intermediate operating position and fluid flow is restricted by the second ball; and

(f) increasing pressure behind the second ball to cause the second ball to pass through the sleeve, the releasing pressure allowing the

sleeve to move to the first position relative to the body wherein the first and second radial outlets are arranged in the first operating position.

26. A method as claimed in Claim 24 or Claim 25 wherein the method includes the step of moving the sleeve against a mechanical bias.

27. A method as claimed in any one of Claims 24 to 26 wherein the method includes the step of controlling movement of the sleeve relative to the body by use of an index sleeve.

28. A method as claimed in any one of Claims 24 to 27 wherein the method includes the step of decelerating the ball as it passes from the sleeve to dissipate the pressure.

29. A method as claimed in any one of Claims 24 to 28 wherein the method includes the step of stopping the ball in a second ball seat after it has passed through the sleeve.

30. A method as claimed in Claim 29 wherein the method further includes the step of preventing fluid flow through the work string while directing it through the radial ports.

31. A method as claimed in any one of Claims 24 to 30 wherein the method includes the step of catching the dropped balls in the work string.

32. A ball arrester for dissipating momentum of a ball after it has passed through a ball seat, the arrester comprising a substantially cylindrical body in which is located a non-linear pathway through which the ball is guided.

33. A ball arrester as claimed in Claim 32 wherein the pathway comprises a plurality of surfaces transversely arranged to a central bore.

34. A ball seat for a downhole tool, the ball seat comprising a plurality of part cylindrical sleeves which can shuttle with respect to each other, longitudinally in the tool, wherein a ball can only pass through the seat when the sleeves are located at their longitudinal extent.

35. A ball seat for a downhole tool as claimed in Claim 34 wherein at least a first sleeve is stationary while at least a second sleeve moves thereover.

36. An actuation mechanism for a downhole tool, the mechanism comprising a substantially cylindrical body having a central bore running axially therethrough, a sleeve located within the bore, the sleeve including a deformable ball seat, mechanical biasing means located between the sleeve and the body to bias the sleeve in a first direction and a ball, wherein the deformable ball seat releasably retains the ball to prevent fluid flow through the sleeve and cause the sleeve to move in the reverse direction relative to the body and

wherein on release of the ball the seat returns to its original dimensions.

37. An actuation mechanism as claimed in Claim 36 wherein the ball seat comprises a spring.

38. An actuation mechanism as claimed in Claim 37 wherein the spring is a plurality of disc springs in a layered structure.

39. An actuation mechanism for a downhole tool, the mechanism comprising a substantially cylindrical body having a central bore running axially therethrough, a sleeve located within the bore, the sleeve including a helical channel on an inner surface, mechanical biasing means located between the sleeve and the body to bias the sleeve in a first direction and a ball, sized to run in the helical channel in a reverse direction to prevent a majority of fluid flow through the sleeve and cause the sleeve to move in the reverse direction relative to the body.

40. An actuation mechanism as claimed in Claim 39 wherein the mechanical bias is a strong spring.

41. An actuation mechanism as claimed in Claim 39 or Claim 40 wherein the helical channel has a left hand thread so that a ball travelling through the seat travels in the opposite direction to the rotation of the work string.

42. An actuation mechanism as claimed in Claim 41 wherein a pitch of the thread is greater than or equal to a diameter of the ball intended to pass therethrough.